

ECOSYSTEM ADVISORY SUBPANEL REPORT ON THE
CALIFORNIA CURRENT ECOSYSTEM REPORT INCLUDING INTEGRATED
ECOSYSTEM ASSESSMENT

The Ecosystem Advisory Subpanel (EAS) met on March 8, 2016 to discuss the 2016 California Current Ecosystem Status Report, presented by Dr. Chris Harvey and Dr. Toby Garfield of the Integrated Ecosystem Assessment (IEA) Team, in a joint session with the Ad Hoc Ecosystem Workgroup (EWG) and the Habitat Committee (HC). We also met on the same day in separate session to produce this report. As is usual with the EAS, this report represents the consensus opinions from our diverse group of at-large representatives.

The time afforded to ecosystem management in the Council's meetings speaks to its importance, and the current pace and uncertainty of changes in ocean conditions justifies this attention. The 2016 ecosystem status report—the fourth in this series—demonstrates continued progress in data synthesis and analyses, an emerging ability to report on unusual events like the “warm blob,” and improvements in communicating the information to the Council and its advisory bodies. This is an immense and difficult job. The EAS is impressed by this work and finds a great deal of value in the report and the science that supports it, and we commend the IEA Team and the many scientists whose work underpins this system-level perspective.

The report documents sharp changes in the physical environment and supports widespread observations from scientists and fishermen that the system is changing in ways that cannot be explained by our knowledge of cyclical patterns in ocean conditions. In some cases, there are tight associations with biological responses; but the physical and biological changes are not consistent across the system, revealing the importance of understanding responses at finer spatial scales and over longer time frames. Nonetheless, the report is immediately applicable to issues the Council addresses.

As an example, the Coastal Pelagic Species Fishery Management Plan (FMP) includes a goal to “provide adequate prey for dependent species.” The State of the California Current Ecosystem report notes that high energy forage fish (sardine and anchovy) in the central California Current have remained at low levels, and that there has been a downward trend in high energy forage fish abundance in the southern California Current. The recent unusual mortality event in California sea lions and the increase in common murre wrecks highlight the need to consider ecosystem information when setting management measures and catch limits.

Similarly, the report calls attention to the cyclical shift from northern, high energy copepods to less lipid-rich southern species. Shifts to southern copepods have been correlated with lower Columbia River salmon returns. The report also highlights recent drought conditions and poor physical and biological conditions for salmon smolt survival. The latter are more landward examples of ecosystem information that can also be considered when setting management and recovery measures.

There is an opportunity to improve the interpretation of data in the report by expanding on the social and economic data collection and synthesis. Trends in fisheries dependent data (landings, for instance) can be problematic as ecosystem indicators because they also respond to changes in

markets and the management framework. Despite this complication, fisheries-derived data should be included, and we encourage more interpretation and synthesis, especially considered with input from the industry.

The report presents an enormous amount of complex and interrelated data, so how the data are presented can make a difference in the take-home points people draw from the report. The IEA Team is beginning to display the data spatially as well as in time series. Drs. Harvey and Garfield provided a good example of combining the two in a slide showing North Pacific sea surface temperature maps for 2014-15 in their oral presentation. We want to encourage them to keep exploring how to present time series data in a spatial context, because it communicates more information about how the system is changing.

This year's report demonstrates an emerging capacity to describe rapid changes and anomalies (e.g., the "warm blob," sea lion pup mortalities, and common murre wrecks) as well as long-term trends. It is important to retain and build out this capacity, in part by encouraging cross-sector conversations like the webinars in January and February for the Coordinated Ecosystem Indicator Review Initiative and the joint advisory body meeting with the IEA Team yesterday morning. Future reports could use similar discussions to guide data synthesis on harmful algal blooms and anoxic events, for instance.

Additional comments:

- Section 4.2 (pages 10 – 12) uses a mixture of fisheries-derived data catches per unit of effort (CPUE) and fisheries-independent ecological data (CalCOFI larval abundance surveys) to make regional comparisons of forage availability across the system. CPUE responds to a lot of factors that are not related to the state of the ecosystem, so this is not a good comparison (but it highlights the paucity of system-wide data).
- We would like to see more information about latitudinal shifts in target species and protected species within the ecosystem so that managers and fishermen can anticipate where the target stocks will be available and the potential for interactions that would put protected species at risk.
- Because this report is distributed and used in a variety of formats, the graphics need to work in multiple media, sometimes without color. Table 4.3.1 on page 13 is a good example of graphics that are difficult to interpret in a black-and-white print copy.
- Section 5.2 of the report introduces a new indicator for seafloor disturbance in the form of "seafloor distance disturbed by fishing gear." We had an energetic discussion about the value of this metric. As presented in the report, the data do not convey the variability of impacts of bottom fishing gear across gear types, habitat types, and fishing intensity; and they are not very useful in interpreting the overall impact of bottom fishing gear relative to ecosystem-scale drivers.
- The indices of community vulnerability in section 6.1 would benefit from more conversations with community members. (We understand that social scientists associated with the IEA Team are planning this.) For instance, EAS members recognized anomalies in the fishing dependent communities listed in Figure 6.1.1.
- The EAS members are also interested in the personal use issues summarized in section 6.3, but we recognize challenges to producing and compiling reliable data. While not having the economic or ecological impacts of commercial fishing these landings are important to coastal communities. Additional personal use probably goes unreported or is included in data reported for recreational fisheries.

Some thoughts about the applicability of ecosystem data and these reports to Council decisions, relevant to the Coordinated Ecosystem Indicator Review Initiative (D.2).

- The goal of improving the usefulness of the annual report to Council processes was supported by the IEA Team, the EWG, and the EAS during our joint session Tuesday morning. Risk assessments that draw on data from the IEA are a means to achieve this goal.
- The report presents many high-level, complicated data, but how those data might be applied to individual FMPs is not clear. One approach being explored in the sablefish ecosystem project compares year class success to ocean conditions, which provides lower level information that is applicable to the stock assessment.
- An FMP-by-FMP look at how ecosystem information could be applied to the stock assessment and management process would provide the Council with additional broad guidance on risks arising from changes in ecosystem conditions. The EWG began this process by assessing shared goals in FMPs (Table 2 in Agenda Item D.1.a from the September, 2015 meeting), and a next step is to link indicators to the FMP and Fishery Ecosystem Plan goals.
- We encourage ground-truthing the report with the Council's advisory bodies and discussing how it can be applied to decision processes currently before the Council's management teams. The joint meeting of the EAS, EWG, and the HC yesterday morning was good and efficient. These might be held as webinars.

In closing, we believe this report represents real progress toward the Council's goal to consider ecosystem factors in its decisions, and we think you are on the right track.

PFMC
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